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Common questions about Asian soybean rust

Daren S. Mueller

Iowa State University, dsmuelle@iastate.edu

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ICM > 2006 > IC-496 (3) -- February 27, 2006

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Common questions about Asian soybean rust

by Daren Mueller, Department of Plant Pathology

Why don't Southerners just kill kudzu or at least spray it with fungicides?

As a native Midwesterner, I had no idea what kudzu was until I took a fishing trip to Florida while attending college, and until I lived in Georgia for two years. I now know enough about kudzu to feel that we all need to have a greater appreciation of kudzu patches. You cannot easily remove or kill kudzu. Kudzu patches can be very large, in close quarters with the public, or in areas that are inaccessible to spray equipment. They are also very resilient and are not susceptible to herbicides like Roundup. So, kudzu is not like a patch of Canada thistle. You can't simply go out back and hit it with Roundup or another herbicide.

Two kudzu patches that escaped killing frosts in southern Georgia were found to be infected with rust and were subsequently destroyed, but in these cases, the vast majority of the vines were already dead. Despite these reports, we are going to have to deal with kudzu being a host for soybean rust for years to come.



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A surviving kudzu patch infected with soybean rust was found in Georgia. It was destroyed a few weeks later. (Layla Sconyers)

With all the hurricanes this past summer, why didn't we see more spread of the disease?

Remember that for disease to develop, you need a susceptible host (soybean), the pathogen (the fungus), and a conducive environment. Even if spores were transferred from the hurricane activity, they still need to land on soybean plants at the right growth stage with periods of extended leaf wetness and moderate temperatures.

It is possible that some year in the future, conditions will be favorable to produce a hurricane that will disperse rust spores at a time that favors disease development.

What we can learn about the effect on soybean rust movement during the historic 2005 hurricane season is that there is more to soybean rust development than hurricanes spreading spores.

Any promising word in terms of resistance?

Not really, although a worldwide effort is being made to identify new sources of resistance and determine the stability of the few sources of resistance currently available.

Teliospores were found in Florida. What does that mean?

Without getting into too much mycological detail, most rust fungi need two hosts to complete all stages of their life cycle: a primary host and an alternate host. These hosts are often not closely related botanically (i.e., wheat and barberry for stem rust of wheat). Kudzu or other susceptible legumes are alternative hosts of *Phakopsora pachyrhizi*, the soybean rust fungus. They are infected by the same type of spores (urediniospores) that infect soybean. An alternate host is infected by another type of spore produced from teliospores.

To date, the alternate host that would complete the life cycle for *P. pachyrhizi* is unknown. But since teliospores have been found, there is a possibility that the soybean rust fungus has found its alternate host and is completing all stages of its life cycle. If this is true, it becomes important for two reasons. First, it gives the rust fungus yet another way to survive the winter because teliospores are thick walled and can survive adverse conditions longer than other rust spores. Second, it gives the rust fungus the ability to adapt more quickly to management strategies (like certain fungicides and soybean resistance) because there will be more genetic diversity in the pathogen population.

What about phytotoxicity associated with tebuconazole fungicide?

What we have learned from lessons in Brazil is that phytotoxicity will occasionally occur when spraying tebuconazole prior to hot, dry conditions, and the addition of surfactants will increase symptoms. There does seem to be a varietal difference; a study at the University of Illinois suggests that approximately 25 percent of cultivars are susceptible to this phytotoxicity.

The symptoms are very similar to sudden death syndrome (SDS) or brown stem rot (BSR) foliar symptoms (yellowing between the veins). However, phytotoxicity will be more uniform across the field than SDS and BSR, which occur in irregular patches. There have been no

reports of tebuconazole injury affecting yield, although this has not been closely studied.



Tebuconazole injury. (Wayne Pedersen)

Rust in Mexico? Any truth to this rumor?

On February 16, 2006, the first official discovery of Asian soybean rust in Mexico was reported. The disease was found at low incidence on soybeans in two east-central states in late October 2005. The two states were Tamaulipas, the northernmost Mexican state that borders the Gulf of Mexico, and San Luis Potosi, which borders Tamaulipas to the west. It is still unknown whether soybean rust has overwintered and is still present in Mexico

Were rust spores found in Minnesota in 2005? Any truth to this rumor? Can't spores be moved hundreds of miles in a day by high wind currents?

Yes. See the article [Three things that will affect soybean rust development in the Midwest in the future](#) in this edition of the *ICM Newsletter*.

How can we be sure rust will slowly move from the South to the North?

Despite the spores ability to move long distances, the disease has not shown the ability to jump long distances in the United States. This is similar to other rust diseases corn and wheat rust that move northward 20 to 30 miles per day. The spores that travel greater than 30 miles may not be viable. Research on the limits of spore survival is ongoing at several universities.

Do rust infections always occur on the bottom of soybean plants?

Like most things in science, nothing is absolute. Rust infections may occur higher up on soybean plants; however, the bottom of the canopy supplies a much more conducive environment for infection and most likely will be the place for the initial infections.

Will the rust fungus be able to adapt to survive over winter once it makes it to Iowa?

No. The one good thing about this disease is that no matter how much disease there is in a particular year, the slate will be cleaned each year in Iowa because the rust fungus needs green leaf tissue to stay alive and the spores cannot survive over winter. The only possible exception is if the fungus finds an alternate host (see answer to question on teliospores above).

Will I need to be concerned about the soybean rust fungus developing resistance to the fungicides being used?

Yes, fungicide resistance developing in soybean rust populations is a major concern, especially with the strobilurin fungicides and to a lesser extent the triazole fungicides. Resistance concerns are based on the unique modes of action represented by the strobilurins and triazoles.

Fungicide resistance has not been reported yet for soybean rust, but has been reported on other pathogens at many locations in the world, including the United States. It is important to protect these effective groups of fungicides because these fungicides are the first line of defense against soybean rust.

Four things you can do to minimize the chances of fungicide resistance developing are:

- Alternate use of a fungicide with another product that has a different mode of action.
- Limit solo applications of strobilurins and triazole fungicides to one and two applications per season, respectively.
- Use a premix product that contains both a preventative (strobilurin) and curative (triazole) fungicide.
- Monitor treated fields for signs of resistance development.

If soybean rust continues to develop after application, contact your chemical representative or

extension personnel. Scouting fields for soybean rust prior to fungicide application and after application is very important.

Once I find soybean rust in one of my fields, do I need to be worried about spreading it to other fields while scouting?

When soybean rust moves into an area, it is possible that not all fields will initially be infected. It will not hurt to take extra precautions when moving from potentially infected fields to fields of undetermined infection. However, the amount of spores carried in person will be negligible compared to those in the air.

Soybean rust spores were found on aphids, what does this mean?

Rust spores are already very adept at moving in wind currents. When aphids sprout wings and move from field to field, they could move spores as well. However, more than likely this will have no impact on overall spore dispersal and disease development.

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